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(54) STARTER FOR INTERNAL COMBUSTION ENGINE AND STARTING METHOD

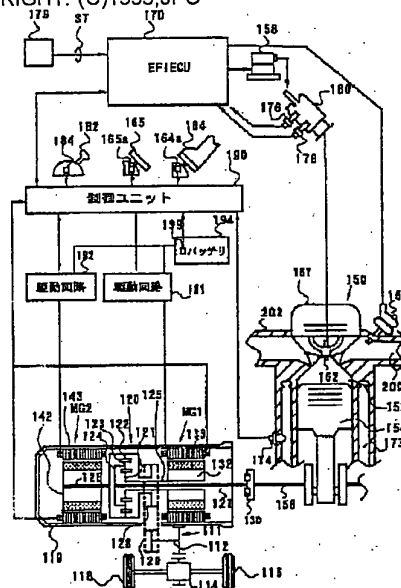
(57) Abstract:

PROBLEM TO BE SOLVED: To start an internal combustion engine without imposing an excessive burden on a battery by setting starting torque to be added to an output shaft of the internal combustion engine by a motor at the time of starting the internal combustion engine, according to the predetermined relation when the rotating speed of the internal combustion engine is the specified changeover rotating speed or less.

SOLUTION: When a driver turns on a starter switch 179 at the time of starting an internal combustion engine, processing for setting the opening/closing timing of an intake valve to the most delay side, that is, processing for making an intake valve closing angle δ largest, is performed in an ECU 170. A solenoid valve in continuously variable valve timing mechanism 157 is therefore controlled to change the intake valve closing angle δ . Starting torque added to an output shaft of the internal combustion engine 150, that is, target torque of a motor MG1 for starting the internal combustion engine 150, is then set according to the predetermined relation when the engine speed is the specified rotating speed or less, that is, starting torque is so set as to

be gradually increased at a specified degree determined according to the vibrational characteristic of a system.

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